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## The genus *Zythos* (Lepidoptera, Geometridae) of Wallacea

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**Abstract** The genus *Zythos* Fletcher of Wallacea is reviewed. Two new species, *Z. clypeata* and *Z. modesta*, are described from the Philippines, and *Z. strigata* (Warren) is newly added to the Philippine fauna.

**Key words** Lepidoptera, Geometridae, *Zythos*, Wallacea, taxonomy.

*Zythos* Fletcher is a replacement name for *Nobilia* Walker (Fletcher, 1979). Due to the resemblance in appearance, this small sterrhine genus had been in some taxonomic confusion until Prout (1932) revised and classified it into seven species on the basis of the male genital structure. Later, Prout (1938) added two new species and three new subspecies. Thus, this genus has been known to include nine species and three sub-species ranging in the Indo-Australian region. In the Philippines, *Zythos* has hitherto been represented only by a single species, *Z. turbata* (Walker), and in Sulawesi by two endemic species, *Z. erotica* (Prout) and *Z. fastigata* (Prout). Through the examination of material in the collections of Zoologisk Museum, Copenhagen, National Science Museum, Tokyo (NSMT) and myself, I found further three species from the Philippines. One is *Z. strigata* (Warren), a relatively well-known species ranging in Sundaland, and the other two are revealed to be new species.

### *Zythos turbata* (Walker) (Fig. 1)

*Nobilia turbata* Walker, 1862, List Specimens lepid. Insects Colln Br. Mus. 24 : 1098.

*Plutodes strigularia* Snellen, 1880, Midden Sumatra 4 : 57.

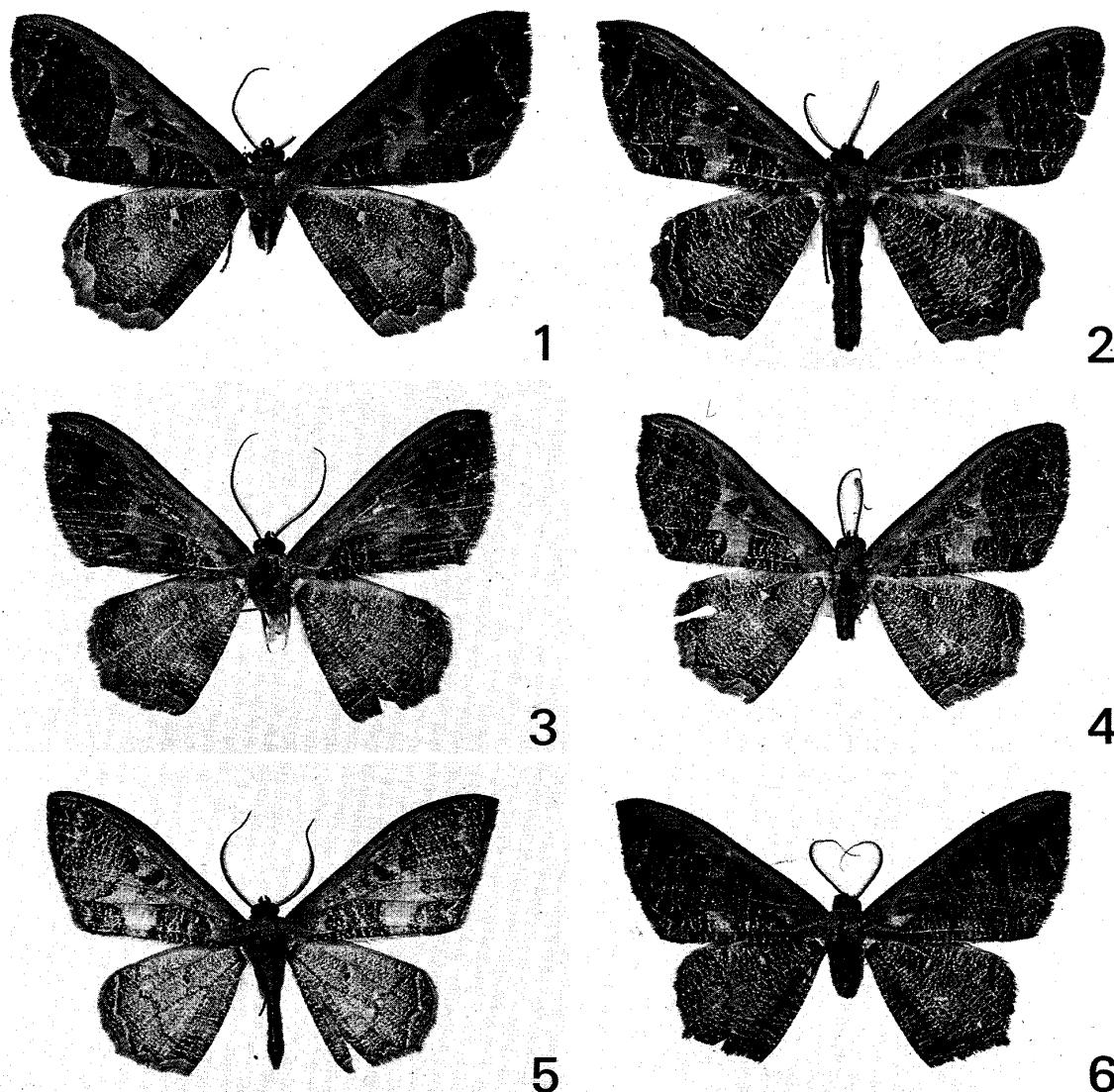
*Somatina turbata* : Hampson, 1895, Fauna Br. India (Moths) 3 : 465.

The male and female genitalia are as shown in Figs 7 & 17.

Specimens examined. Philippines. Mindanao : Davao, Upper Baracatan, Apo Range, Mt Talomo (1,100 m), 2 ♂, 3-6. viii. 1985, 1 ♀, 17-19. viii. 1985 (M. Owada); South Cotabato, Maitum, Gasy (700 m), 1 ♂, 12-13. viii. 1985 (M. Owada); South Cotabato, Maitum, Motoklot (650 m), 1 ♂, 11. viii. 1985 (M. Owada). Palawan : Mantalingajan, Pinigisan (600 m), 1 ♀, 9. ix. 1961, 1 ♂, 14. ix. 1961 (Noona Dan Exp. 61-62); Languan (100 m), 1 ♀, 1. ix. 1985 (M. Owada); Matalangao (150 m), 1 ♀, 28-30. viii. 1985 (M. Owada). Tawi Tawi I. : Tarawakan, north of Batu Batu, 4 ♂, 11-14. xi. 1961 (Noona Dan Exp. 61-62).

Distribution. Myanmar, Peninsular Malaysia, Sumatra, Java, Borneo, Philippines (Mindanao, Mindoro, Palawan and Tawi Tawi I.).

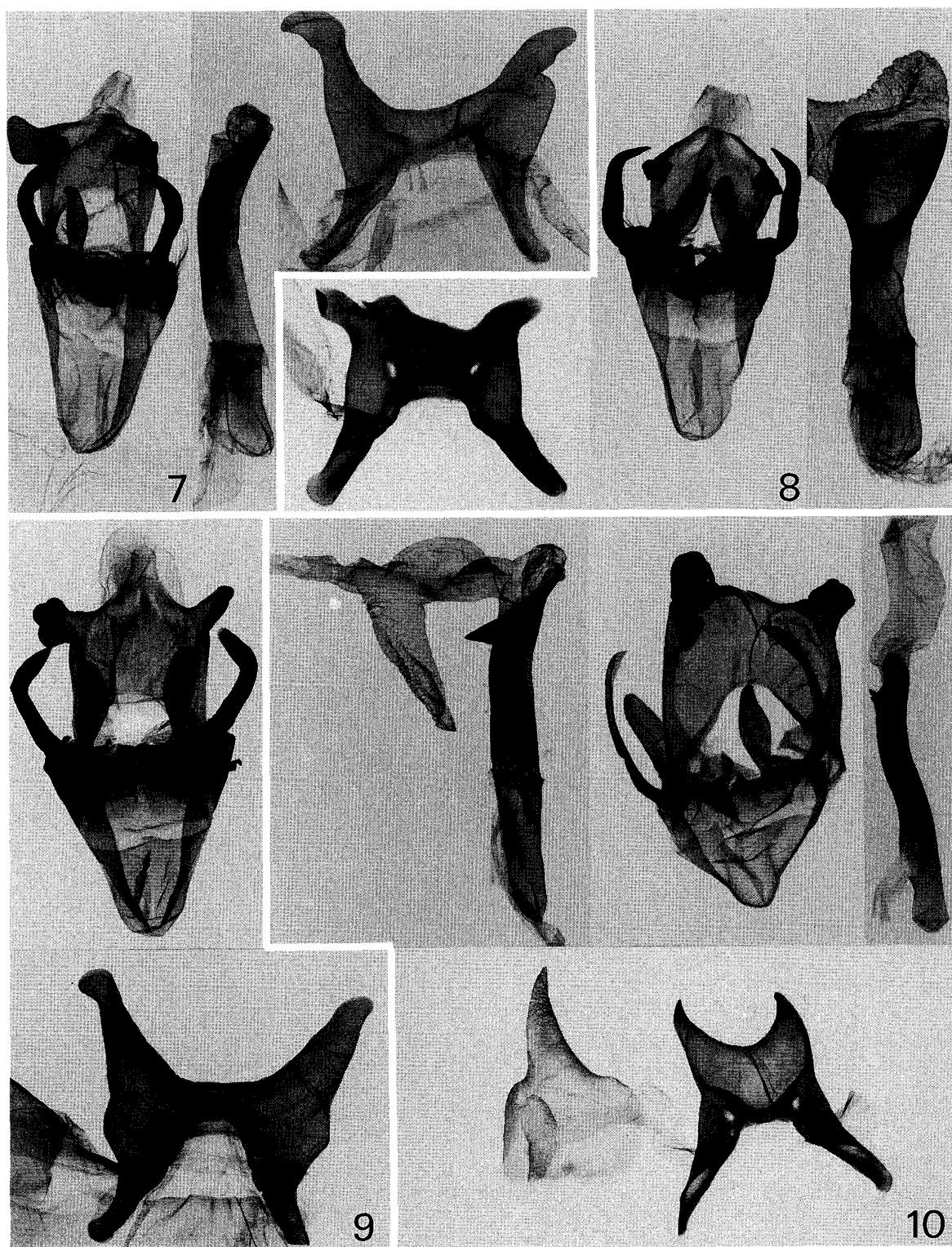
This species is widely distributed from S. Myanmar to Sundaland and the Philippines, but does not inhabit Sulawesi. As already suggested by Prout (1932), *turbata* appears to vary in the structure of genitalia geographically. The specimens from Palawan and Tawi Tawi are almost identical in the genitalia of both sexes to those from Borneo (type locality of *turbata*), however the Mindanao specimens show a little differences from them. In the male of Mindanao specimens, the distal lobe of tegumen and its basal appendix are more prominently produced, the aedeagus has subapical scobination consisting of much larger conical spines, and the eighth sternite has a caudal process much longer. In the



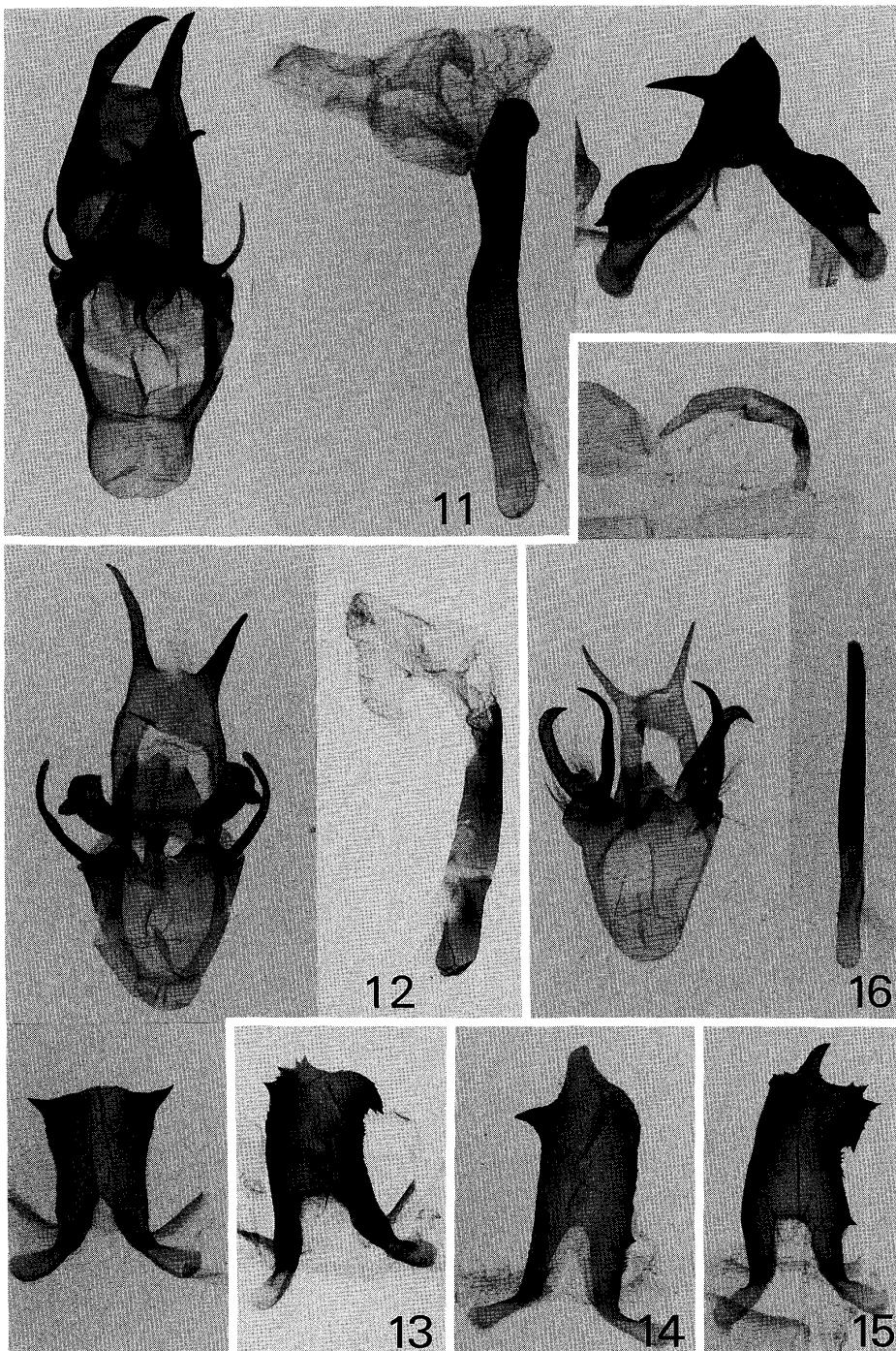
Figs 1 - 6. *Zythos* spp. 1. *Z. turbata* (Walker), ♂. 2. *Z. erotica* (Prout), ♂. 3. *Z. modesta* sp. n., holotype, ♂. 4. *Z. clypeata* sp. n., holotype, ♂. 5. *Z. fastigata* (Prout), ♂. 6. *Z. strigata* (Warren), ♂.

Mindanao females, the median plate of lamella antevaginalis has distal margin bilobed rather than nearly entire. The population of Mindanao might be separable as a distinct subspecies. *Z. avellanea* (Prout), ranging from N. India to Sundaland, has similar appearance to *turbata*, but is distinguished by somewhat paler coloration, and the forewing having a median olive gray patch broader in posterior half and postmedian line more strongly produced outwards on vein CuA<sub>2</sub>. The male genitalia of *avellanea* (Fig. 11) are widely different from *turbata* in having caudally narrower tegumen with a pair of long and rather slender distal processes.

In the male genitalia, this and the following three species share the tegumen being broad caudally with a rather short and broad lobe bilaterally at caudal end, which is usually accompanied with a small basal lobe.



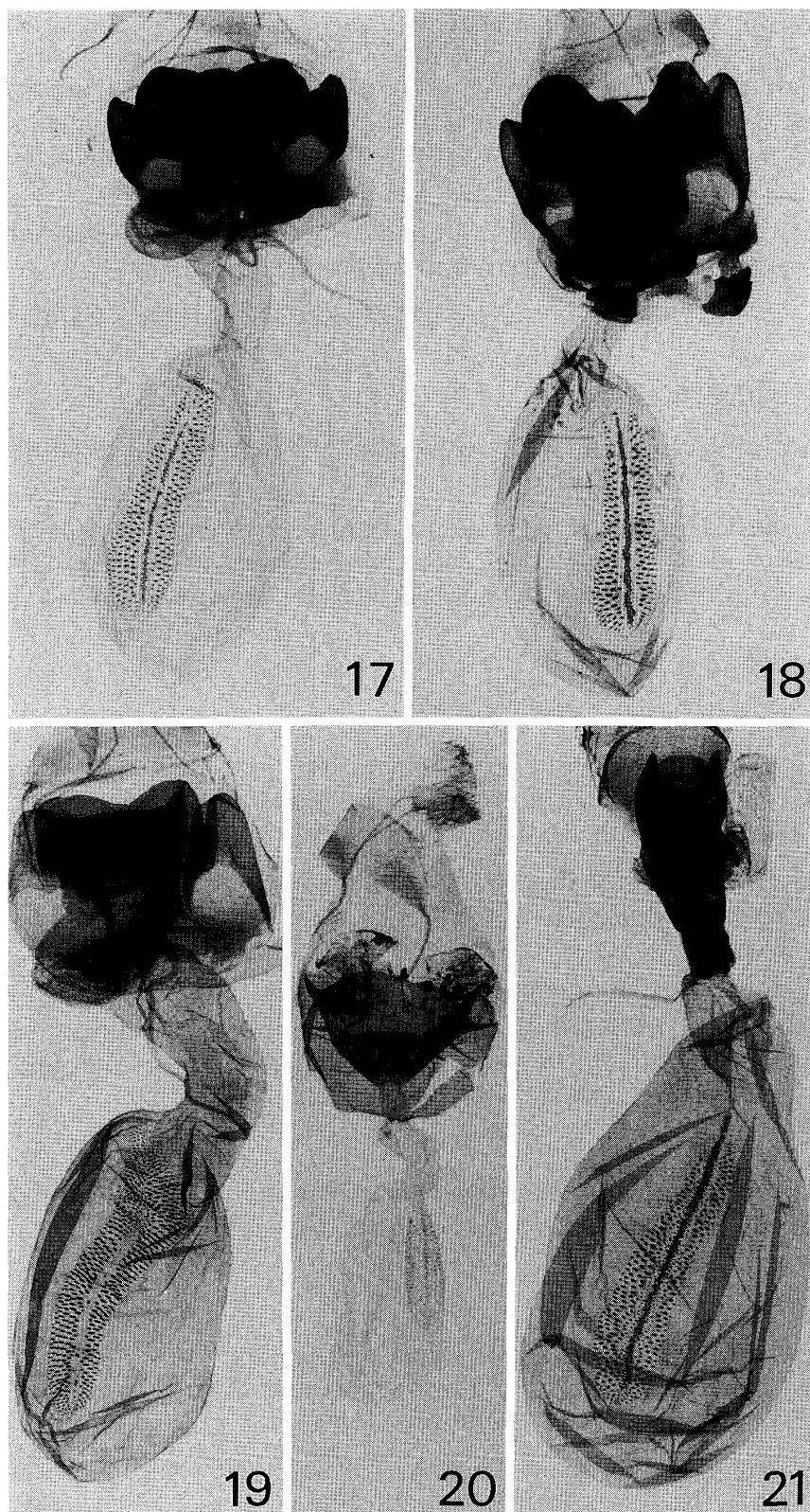
Figs 7-10. Male genitalia of *Zythos* spp. 7. *Z. turbata* (Walker). 8. *Z. erotica* (Prout).  
9. *Z. clypeata* sp. n., holotype. 10. *Z. modesta* sp. n., holotype.



Figs 11-16. Male genitalia of *Zythos* spp. 11. *Z. avellanea* (Prout). 12-15. *Z. strigata* (Warren) (12: Philippines, Palawan, 13: Malay Peninsula, 14: Borneo, 15: Sumatra). 16. *Z. fastigata* (Prout).

***Zythos clypeata* sp. n. (Fig. 4)**

Expanse 33-34 mm. Smaller than *turbata*. Similar in appearance to *turbata*, distinguished from it only by relatively paler coloration and forewing having a median olive gray patch broader in posterior half.



Figs 17-21. Female genitalia of *Zythos* spp. 17. *Z. turbata* (Walker). 18. *Z. clypeata* sp. n., paratype. 19. *Z. erotica* (Prout). 20. *Z. fastigata* (Prout). 21. *Z. strigata* (Warren).

Male genitalia (Fig. 9). Nearly identical with those of *turbata*. Tegumen with caudal margin produced caudally at middle to a stout, uncus-like process with round apex; distal lobe of left side expanded distally. Valva with dorsal arm strongly bent at distal third, rather than roundly curved as in *turbata*; ventral arm longer and broader than in *turbata*. Aedeagus with a large, triangular subapical process which is accompanied cephalically with a small semicircular sclerite with serrate margin.

Female genitalia (Fig. 18). Similar to those of *turbata*, distinguished by median plate of lamella antevaginalis with distal margin more prominently bilobed.

Holotype. ♂, Philippines, Leyte, xi. 1994 in NSMT. Paratype. Same data as holotype, 1 ♀.

Distribution. Philippines (Leyte).

The genitalia of both sexes evidently show that this species is the closest relative of *turbata*, which has not yet been found in Leyte.

The following species, *erotica* (Prout), also resembles *clypeata* sp. n. but is separated by larger size, paler coloration of wings with more obvious gray strigulation, and postmedian line of forewing more prominently produced outwards on vein CuA<sub>2</sub>.

### ***Zythos erotica* (Prout) (Fig. 2)**

*Nobilia erotica* Prout, 1932, *Novit. zool.* 38 : 4.

Male genitalia (Fig. 8). Readily separable from the preceding two species in having distal lobe of tegumen obsolete, with basal lobe roundish, scobinate; aedeagus rather broad, dilated distally; eighth sternite with a caudal process short.

Female genitalia (Fig. 19). Median plate of lamella antevaginalis as in *turbata*. Ostium bursae broader than in the preceding two species. Corpus bursae with signum lacking median ribbon-like sclerite.

Specimens examined. Sulawesi: Palu, Palolo (700 m), 1 ♂, 1985; 2 ♂ 1 ♀, ii. 1986 (S. Nagai), 1 ♂ 1 ♀, 26-28. iii. 1989 (N. Kashiwai); Tondano, Mt Makaweiben (1,000 m), 2 ♂, xii. 1988; Sanpuraga, 1 ♀, 15-19. iv. 1994; Ulunggolaka, Kolaka, 1 ♂, 15. viii. 1991 (S. Sugimoto); Kolaka, Kendari, 2 ♂, 18. viii. 1991 (N. Oonishi).

Distribution. Sulawesi.

This is an endemic species to Sulawesi, resembling the preceding two species, but is easily separable by the rather characteristic genitalia of both sexes.

### ***Zythos modesta* sp. n. (Fig. 3)**

Expanse 32 mm. Smaller than the preceding three species. In coloration rather similar to *erotica*, distinguished by forewing having postmedian line less strongly produced outwards on vein CuA<sub>2</sub>, and more fine strigulation.

Male genitalia (Fig. 10). Tegumen elongate, much longer than vinculum; distal lobe somewhat similar to that of *clypeata* sp. n., differing in having left one nearly quadrate, with basal lobe set more anteriorly. Valva with dorsal arm long and slender, gently curved ventrally; ventral arm nearly as in *turbata*. Aedeagus slightly more slender than in *turbata*, bearing a few subapical conical spines. Eighth sternite with a caudal process much shorter than in *turbata*, tapered towards bluntly pointed apex. Eighth tergite with a large thorn-like process at middle.

Holotype. ♂, Philippines, Bohol I., 28. ix. 1978 (T. Endo) in NSMT.

Distribution. Philippines (Bohol I.).

This species also resembles *turbata* and *clypeata* sp. n. in having less strongly produced postmedian line on the forewing, but the smaller size and rather paler coloration differentiate *modesta* sp. n. In the male genitalia, the shape of distal lobe of tegumen and dorsal arm of valva is distinctive.

### ***Zythos fastigata* (Prout) (Fig. 5)**

*Nobilia fastigata* Prout, 1938, in Seitz, *Gross-Schmett. Erde* 12: 190, pl. 20, row c.

Male genitalia (Fig. 16). Tegumen narrower caudally than in the preceding four species, bearing a pair of long, thorn-like processes at distal margin. Dorsal arm of valva slender, gently curved ventrally in distal half; ventral arm relatively long, slender, curved dorsally before apex. Aedeagus long and slender, without subapical spines. Eighth sternite very narrowly sclerotized, with a pair of small conical spines at middle.

Female genitalia (Fig. 20). Ostium bursae cup-shaped. Seventh segment not characteristically sclerotized.

Specimens examined. Sulawesi: Palolo (1,300 m), 1 ♀, x-xi. 1985; Tondano, Mt Makawieben (1,000 m), 1 ♂, xii. 1988; Sanpuraga, 1 ♂, 15-19. iv. 1994.

Distribution. Sulawesi.

*Z. fastigata* was described from Sulawesi. The facies is rather distinctive in having much paler wings with postmedian line of forewing remarkably produced outwards on vein CuA<sub>2</sub>, nearly reaching subterminal line. In the male genitalia, the narrow tegumen with a pair of long distal processes, which readily separates *fastigata* from the preceding four species, is shared with *avellanea*, *obliterata* (Warren) and the following species, *strigata* (Warren).

### ***Zythos strigata* (Warren) (Fig. 6)**

*Nobilia strigata* Warren, 1896, *Novit. zool.* 3: 112.

Male genitalia (Fig. 12). Distal process of tegumen asymmetrical, left one longer than the right one. Valva with dorsal arm slender; ventral arm broad, bearing a subapical thumb-like process. Aedeagus rather short, without subapical spines. Eighth sternite with caudal margin nearly even, slightly produced bilaterally.

Female genitalia (Fig. 21). Ostium bursae long and relatively slender. Lamella antevaginalis with median plate long, round at apex.

Specimens examined. Philippines. Palawan: Matalangao (150 m), 2 ♂, 28-30. viii. 1985 (M. Owada). Balabac I.: Dalawan Bay, 1 ♀, 13. x. 1961, 1 ♀, 8. x. 1961 (Noona Dan Exp. 61-62).

Distribution. Peninsular Malaysia, Borneo, Java, Bali, Philippines (Palawan and Balabac I.).

Recorded for the first time from the Philippines. Prout (1938) described a subspecies *rubescens* from Bali on the basis of a single female. The Philippine specimens are almost indistinguishable in appearance from the nominate subspecies. However, the shape of eighth sternite is, so far as my investigation, somewhat variable geographically (and sometimes individually) as shown in Figs 12-15. So the Philippine population (and

possibly some others) may be separated subspecifically after further study based on more material, especially the male specimens from Bali.

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## 摘要

ウォーレシアの *Zythos* 属 (シャクガ科, ヒメシャク亜科) (矢崎克己)

ウォーレシアの *Zythos* 属はフィリピンから 1 種, *Z. turbata* (Walker) (ミャンマーからスンダランドの広分布種), スラウェシから 2 種, *Z. erotica* (Prout), *Z. fastigata* (Prout) (どちらもスラウェシの固有種) が知られていた。本文ではフィリピンから *Z. clypeata* sp. n., *Z. modesta* sp. n. の 2 新種を記載し, *Z. strigata* (Warren) (スンダランドの広分布種) を初めて記録した。

これらの 6 種のうち, *turbata*, *erotica*, *clypeata* sp. n., *modesta* sp. n. の 4 種は外観・雌雄交尾器形態ともによく似ているが, 大きさ, 色彩, 前翅外横線の走り方, 雄交尾器の tegumen の形状などに種の違いが表われる。他の 2 種, *fastigata*, *strigata* は外観での区別が容易である。

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